

- d) A space-filling curve, Patent No. PCT/E\$00/00411 entitled "Space-filling miniature antennas".

In some embodiments, the loading structure described above is connected to the conducting surface while in other embodiments, the tips of a plurality of the loading strips are connected to other strips. In those embodiments where a new loading strip is added to the previous one, said additional load can either have one tip free of connection, or said tip connected to the previous loading strip, or both tips connected to previous strip or one tip connected to previous strip and the other tip connected to the conducting surface.

There are three types of geometries that can be used for the conducting surface according to the present invention:

- a) A polygon (i.e., a triangle, square, trapezoid, pentagon, hexagon, etc. or even a circle or ellipse as a particular case of polygon with a very large number of edges).
- b) A multilevel structure, Patent No. WO0122528 entitled "Multilevel Antennas".
- c) A solid surface with an space-filling perimeter.

In some embodiments, a central portion of said conducting surface is even removed to further reduce the size of the antenna. Also, it is clear to those skilled in the art that the multilevel or space-filling designs in configurations b) and c) can be used to approximate, for instance, ideal fractal shapes.

Fig.1 and Fig.2 show some examples of the radiating element for a loaded antenna according to the present invention. In drawings 1 to 3 the conducting surface is a trapezoid while in drawings 4 to 7 said surface is a triangle. It can be seen that in these cases, the conducting surface is loaded using different strips with different lengths, orientations and locations around the perimeter of the